Amendment to the Claims

In the Claims:

Please cancel Claim 55.

Please amend Claims 34, 35, 40, 42, 43, 46, 50, 51, and 54; and add new Claims 56-61, as follows:

Claims 1-33 (Previously Canceled)

34. (Currently Amended) A method for detecting a feature using an imaging system, where the feature is part of an object and ~~a probe can be attached to the feature~~ the feature can be labeled, comprising the steps of:

(a) ~~providing at least one probe that selectively binds to said feature, wherein said at least one probe comprises a binding element that selectively binds to at least a portion of said feature, and at least one optical signaling component~~;

~~(b) exposing said object to said at least one probe under conditions that cause said at least one probe to bind to at least a portion of said feature, if said feature is part of said object,~~ labeling the feature such that a plurality of different optical signaling components become bound to said feature[[;]], probes suitable for so labeling the feature comprising:

(i) a single type of probe comprising a binding element that selectively binds to at least a portion of the feature, and a plurality of optical signaling components, at least two of which are different, thereby enabling the plurality of different optical signaling components to be bound to said feature; and

(ii) two different types of probes, each of which comprises a binding element that selectively binds to at least a portion of the feature, and at least one optical signaling component, such that the optical signaling components of the two different types of probes are not identical, thereby enabling the plurality of different optical signaling components to be bound to said feature;

(eb) collecting light from said object along a collection path, the light that is collected comprising light corresponding to each of the plurality of different optical signaling components that has been simultaneously collected;

(~~d~~c) dispersing the light that is traveling along the collection path into a plurality of light beams, as a function of a plurality of different discriminable characteristics of the light;

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(ed) focusing each of the plurality of light beams to produce a respective image corresponding to that light beam, thereby simultaneously generating a plurality of images, locations of probes bound to said feature included in the plurality of images being optically discriminated;

(fc) detecting the plurality of images to produce a signal indicative of each optical signaling component, such that a different signal is produced for each of the plurality of images; and

(gf) analyzing each different signal produced for each of the plurality of images to determine if indicative spectral signals produced by the plurality of different optical signaling components are present, thereby establishing that the feature is part of the object.

35. (Currently Amended) The method of Claim 34, wherein the step of ~~exposing said object to said at least one probe~~ labeling the feature comprises the step of exposing said object to [a] the single type of probe ~~that comprises said plurality of different optical signaling components~~, thereby binding said plurality of optical signaling components of the single type of probe to said feature.

36. (Previously Canceled)

37. (Previously Presented) The method of Claim 34, wherein the step of analyzing each different signal produced for each of the plurality of images comprises the step of determining if an intensity of a waveband of light indicative of said plurality of different optical signaling components is present in that image.

38. (Previously Presented) The method of Claim 34, wherein said object comprises a biological cell, and said feature comprises a cellular component.

39. (Previously Presented) The method of Claim 34, wherein the step of analyzing each different signal produced for each of the plurality of images comprises the step of determining if a multiplex of a spectral signature for each of the plurality of different optical signaling components is present in that image.

40. (Currently Amended) The method of Claim 34, wherein the step of ~~exposing said object to said at least one probe~~ labeling the feature comprises the step of exposing said object to ~~at least~~ the two different types of probes, ~~each of which comprises a binding element that selectively binds to at least a portion of the feature, each of which comprises at least one optical signaling component, one of which includes a different optical signaling component~~, thereby binding the plurality of different optical signaling components of the two different types of probes to said feature.

41. (Previously Canceled)

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42. (Currently Amended) A method for probing an object with probes to detect if any of a plurality of specific features are part of the object, using an imaging system ~~that does not spatially resolve locations of the probes on any specific feature~~, wherein such probes can be attached to each such feature, the method comprising the steps of:

(a) for each specific feature to be detected, ~~providing at least one probe that selectively couples to a corresponding specific feature, wherein each probe comprises a binding element that selectively binds to at least a portion of the specific feature, and at least one optical signaling component that is bound to the specific feature by the binding element;~~ providing each type of probe required to uniquely label each specific feature that is part of the object, types of probes suitable for so labeling each specific feature comprising:

(i) one type of probe including a binding element that selectively binds to the feature, and a plurality of optical signaling components, at least two of which are different, thereby enabling the plurality of different optical signaling components to be bound to said feature; and

(ii) two different types of probes, each of which includes a binding element that selectively binds to at least a portion of the feature, and at least one optical signaling component, such that the optical signaling components of the two different types of probes are not identical, thereby enabling the plurality of different optical signaling components to be bound to said feature;

(b) exposing said object to ~~said at least one labeled probe for each specific feature to be detected, under conditions that cause each labeled probe to couple to at least a portion of its corresponding specific feature, if that corresponding specific feature is part of said object, such that at least two different optical signaling components become bound to each specific feature that is part of said object, each of said at least two different optical signaling components that is bound to each specific feature being uniquely optically discriminable~~ each type of probe required to uniquely label each specific feature that is part of the object;

(c) collecting light from said object along a collection path, the light that is collected comprising light corresponding to each ~~of the plurality of different~~ optical signaling ~~components that has~~ component used to label the plurality of specific features that are part of the object, such light having been simultaneously collected;

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(d) dispersing the light that is traveling along the collection path into a plurality of light beams, as a function of a plurality of different discriminable characteristics of the light;

(e) focusing each of the plurality of light beams to produce a respective image corresponding to that light beam, thereby simultaneously generating a plurality of images, locations of probes bound to said feature included in the plurality of images being optically discriminated;

(f) detecting the plurality of images to produce a signal indicative of each optical signaling component present in the plurality of images and used to uniquely label each specific feature that is part of the object, such that a different signal is produced for each of the plurality of images; and

(g) analyzing the signals produced for each of the plurality of images to determine which specific feature is part of the object.

43. (Currently Amended) The method of Claim 42, wherein ~~the step of exposing said object to said at least one probe comprises the step of exposing said object to a labeled probe having a plurality of different optical signaling components, thereby binding the plurality of optical signaling components to said corresponding specific feature that is part of the object~~ at least one specific feature to be detected is labeled with the one type of probe including the plurality of optical signaling components.

44. (Previously Presented) The method of Claim 42, wherein said object comprises a biological cell, and each feature comprises a cellular component.

45. (Previously Canceled)

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46. (Currently Amended) The method of ~~Claim 43~~ Claim 42, wherein ~~the step of exposing said object to said at least one probe comprises the step of exposing said object to at least two probes selected to selectively bind to different portions of a first specific feature, each of said at least two probes comprising:~~ at least one specific feature to be detected is labeled with the two different types of probes including the optical signaling components that are not identical

~~(a) a binding element that selectively binds to at least a portion of the first specific feature; and~~

~~(b) at least one optical signaling component that is bound by the binding element to said at least a portion of the first specific feature, such that one of the at least two probes comprises a different optical signaling component, so that a plurality of different optical signaling components are bound to the first specific feature~~.

47. (Previously Canceled)

48. (Previously Canceled)

49. (Previously Presented) The method of Claim 42, wherein each optical signaling component comprises a fluorescent dye, further comprising the step of directing sufficient energy toward said object, such that the fluorescent dye is excited to emit a fluorescent light comprising a uniquely discriminable characteristic of the optical signaling component.

50. (Currently Amended) The method of Claim 42, wherein ~~an optical signature of said plurality of optical signaling components bound to each~~ at least one specific feature is uniquely discriminable based on an intensity of multiplexed light from [[the]] a plurality of optical signaling components bound to that feature.

51. (Currently Amended) The method of Claim 42, wherein ~~a spectral signature of the plurality of optical signaling components bound to a~~ at least one specific feature is uniquely discriminable based on a spectral composition of light from [[the]] a plurality of optical signaling components bound to that at least one specific feature.

52. (Previously Canceled)

53. (Previously Canceled)

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54. (Currently Amended) A method for detecting a feature using an imaging system, where the feature is part of an object and ~~a probe can be attached to~~ the feature can be uniquely labeled, comprising the steps of:

(a) ~~providing at least one labeled probe that selectively binds to said feature, wherein said at least one labeled probe comprises a binding element that selectively binds to at least a portion of said feature, and at least one optical signaling component~~;

~~(b) exposing said object to said at least one labeled probe under conditions that cause said at least one labeled probe to bind to at least a portion of said feature, if said feature is part of said object,~~ labeling the feature such that a plurality of different optical signaling components become bound to said feature[[;]], types of probes suitable for so labeling each specific feature comprising:

(i) a single type of probe including a binding element that selectively binds to the feature, and a plurality of optical signaling components, at least two of which are different, thereby enabling the plurality of different optical signaling components to be bound to said feature; and

(ii) two different types of probes, each of which includes a binding element that selectively binds to at least a portion of the feature, and at least one optical signaling component, such that the optical signaling components of the two different types of probes are not identical, thereby enabling the plurality of different optical signaling components to be bound to said feature;

(~~e~~b) collecting light from said object along a collection path, while there is relative motion between the object and an apparatus employed to collect the light, the light that is collected comprising light corresponding to each of the plurality of different optical signaling components that has been simultaneously collected;

(c) dispersing the light that is traveling along the collection path into a plurality of light beams, as a function of a plurality of different discriminable characteristics of the light;

(d) focusing ~~the collected light to produce an image corresponding to the object, locations of labeled probes bound to said feature included in the image being optically discriminated but not spatially discriminated in the image~~ each of the plurality of light beams to produce a respective image corresponding to that light beam, thereby simultaneously generating a plurality of images;

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(e) detecting ~~the image to produce a signal indicative of each optical signaling component bound to said feature~~ the plurality of images to produce a signal indicative of each optical signaling component, such that a different signal is produced for each of the plurality of images; and

(f) analyzing ~~the~~ each different signal to determine if a spectral component due to each optical signaling component bound to said feature is present in the image, thereby establishing that said feature is part of the object.

55. (Canceled)

56. (New) A method for detecting a feature using an imaging system, where the feature is part of an object and the feature can be uniquely labeled, comprising the steps of:

(a) labeling the feature such that a plurality of different optical signaling components become bound to said feature;

(b) collecting light from said object along a collection path, while there is relative motion between the object and an apparatus employed to collect the light, the light that is collected comprising light corresponding to each of the plurality of different optical signaling components and being simultaneously collected;

(c) dispersing the light that is traveling along the collection path into a plurality of light beams, such that light from different optical signaling components is included in different ones of plurality of light beams;

(d) focusing each of the plurality of light beams to produce a respective image corresponding to that light beam, thereby simultaneously generating a plurality of images;

(e) detecting the plurality of images to produce a signal indicative of each optical signaling component, such that a different signal is produced for each of the plurality of images; and

(f) analyzing each different signal produced for each of the plurality of images to determine if indicative spectral signals produced by the plurality of different optical signaling components are present, thereby establishing that the feature is part of the object.

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57. (New) The method of Claim 56, wherein the step of labeling the feature such that a plurality of different optical signaling components become bound to said feature comprises the step of exposing the object to a single type of probe comprising a binding element that selectively binds to at least a portion of the feature, and a plurality of optical signaling components, at least two of which are different, thereby enabling the plurality of different optical signaling components to be bound to said feature.

58. (New) The method of Claim 56, wherein the step of labeling the feature such that a plurality of different optical signaling components become bound to said feature comprises the step of exposing the object to two different types of probes, each of which comprises a binding element that selectively binds to at least a portion of the feature, and at least one optical signaling component, such that the optical signaling components of the two different types of probes are not identical, thereby enabling the plurality of different optical signaling components to be bound to said feature.

59. (New) An imaging system for imaging an object to determine if the object includes a specific feature, wherein the specific feature, when present, is labeled with a plurality of different optical signaling components, comprising:

(a) a collection lens disposed so that light traveling from the object passes through the collection lens and is focused along a collection path;

(b) a dispersing component that receives the light from the collection lens and disperses the light into a plurality of light beams, as a function of a plurality of different discriminable characteristics of the light, said plurality of different discriminable characteristics being indicative of the plurality of different optical signaling components;

(c) at least one pixelated detector;

(d) an imaging lens that focuses each of the plurality of light beams on said at least one pixelated detector, producing a respective image corresponding to each of the plurality of light beams, said at least one pixelated detector providing an output signal for each respective image, each output signal indicating whether a different one of the plurality of optical signaling components is present on the object; and

(e) a signal processor coupled to receive the output signals from said at least one pixelated detector, said signal processor processing the output signals to determine whether optical signaling components identified in each respective image indicate that the specific feature is present.

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60. (New) A method for probing an object with probes to detect if any of a plurality of specific features are part of the object, using an imaging system, wherein such probes can be attached to each such specific feature, the method comprising the steps of:

(a) for each specific feature to be detected, providing each type of probe required to uniquely label each specific feature that is part of the object, types of probes suitable for so labeling each specific feature comprising:

(i) plural signaling probes, each plural signaling probe comprising a binding element that selectively binds to at least a portion of said specific feature, and a plurality of optical signaling components, at least two of which are different, thereby enabling a plurality of different optical signaling components to be bound to said specific feature if said specific feature is part of the object; and

(ii) mono signaling probes, each mono signaling probe comprising a binding element that selectively binds to at least a portion of said specific feature, and one optical signaling component, such that two different types of mono signaling probes, each different type including a different optical signaling component, are needed to enable a plurality of different optical signaling components to be bound to said specific feature if said specific feature is part of the object;

(b) exposing said object to each type of probe required to uniquely label each specific feature that is part of the object;

(c) collecting light from said object along a collection path, the light that is collected comprising light corresponding to each optical signaling component used to label the plurality of specific features that are part of the object, such light having been simultaneously collected;

(d) dispersing the light that is traveling along the collection path into a plurality of light beams, as a function of a plurality of different discriminable characteristics of the light;

(e) focusing each of the plurality of light beams to produce a respective image corresponding to that light beam, thereby simultaneously generating a plurality of images, locations of probes bound to said feature included in the plurality of images being optically discriminated;

(f) detecting the plurality of images to produce a signal indicative of each optical signaling component present in the plurality of images and used to uniquely label each specific feature that is part of the object, such that a different signal is produced for each of the plurality of images; and

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(g) analyzing the signals produced for each of the plurality of images to determine which specific feature is part of the object.

61. (New) A method for detecting a feature using an imaging system, where the feature is part of an object and the feature can be uniquely labeled, comprising the steps of:

(a) labeling the feature such that a plurality of different optical signaling components become bound to said feature, the feature being labeled using either:

(i) one type of probe including a binding element that selectively binds to the feature, and a plurality of optical signaling components, at least two of which are different, thereby enabling the plurality of different optical signaling components to be bound to said feature; or

(ii) two different types of probes, each of which includes a binding element that selectively binds to at least a portion of the feature, and at least one optical signaling component, such that the optical signaling components of the two different types of probes are not identical, thereby enabling the plurality of different optical signaling components to be bound to said feature;

(b) collecting light from said object along a collection path, while there is relative motion between the object and an apparatus employed to collect the light, the light that is collected comprising light corresponding to each of the plurality of different optical signaling components that has been simultaneously collected;

(c) dispersing the light that is traveling along the collection path into a plurality of light beams, as a function of a plurality of different discriminable characteristics of the light;

(d) focusing each of the plurality of light beams to produce a respective image corresponding to that light beam, thereby simultaneously generating a plurality of images;

(e) detecting the plurality of images to produce a signal indicative of each optical signaling component, such that a different signal is produced for each of the plurality of images; and

(f) analyzing each different signal to determine if a spectral component due to each optical signaling component bound to said feature is present in the image, thereby establishing that said feature is part of the object.

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